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ciliated cells, which were supposed to be allied to Amœba, an animalcule, because they were seen to take in food apparently through the walls of the body, and not through any proper mouth. Professor Clark shows that *Leucosolenia botryoides* Bowerb. is an aggregation of new forms of Monads closely allied to *Monas termo* Ehren. The existence of a mouth at the base of the flagellum, a lash-like organ present in many infusoria, is demonstrated in all these forms, and all except Monas are described as possessing a hyaline calyx, or cup, surrounding the region of the mouth, like an inverted funnel. The single monads which compose the ciliated layer lining the internal channels of *Leucosolenia*, a common marine sponge, have a similar calyx, are monoflagellate (that is, provided with a single lash-like appendage), and probably have a mouth at the base of the flagellum, since they took in their food in the same manner as the *Monas termo*. The connection between Monas and its allied forms, with the higher Protozoa, or infusoria, such as Euglena, Dysteria, and Pleuronema, is shown by *Anthophysa Mulleri* which has two flagella, like the higher forms mentioned, but like Monas has no calyx, and grows in umbellate colonies like Codosiga. The direct relation anatomically and zoölogically of the sponge with these exceedingly active and beautiful forms is startling, and one sees in the great advance in the study of the Protozoa made by Professor Clark, that, after all, Ehrenberg's belief that these minute forms had a very highly complicated organization, is, like most opinions, not without a kernel of truth. — A. H.

THE PROGRESS OF ZOÖLOGY IN 1866.* — Another volume of this invaluable year-book, which is simply indispensable to the working naturalist, has just been published. We hope it will meet with much encouragement among American zoölogists. In the words of the chief editor, "The object of the Record is to give, in an annual volume, reports on, abstracts of, and an index to, the various zoölogical publications which have appeared in the preceding year; to acquaint zoölogists with the progress of every branch of their science in all parts of the globe; and to form a repertory which will retain its value for the student of future years."

The scientific part of the zoölogical literature of 1864, to which vol. 1 forms a guide, amounts to more than 25,000 pages; that for 1865 amounts to not less than 35,000 pages; and that for 1866 to about 30,000 pages. In the literature for 1865, it is estimated that about 7,000 animals are described as new to science.

In running through the 649 pages of the last volume we glean the following items of interest. — Professor Lilljeborg states in his memoir on the Rodents that about 2,300 species of Mammalia are known, namely, about 700 *Rodents*, 500 *Chiroptera* (Bats), 250 *Feræ* (including Insectivora), 200 *Quadrumana* (Monkies), and about as many *Artiodactyla.** — A. Müller proves that the male fox lives in polygamy, and does not assist in rearing his offspring. — A young Hippopotamus has been successfully reared in the Zoölogical Gardens in Amsterdam. — Mr. G. O. Sars refers to the contradictory statements of naturalists with regard to the ejection of water from the blow-holes of whales. He states that if the head with the blow-hole is raised above the surface of the water, nothing but air is expelled; but if, at the moment of expiration, the head is still below the surface of the water, the force of the air expelled carries a portion of the water with it, causing a more or less perceptible spray. — In ornithology, the most important fact elicited during the year is the discovery of the bones of the Dodo by Mr. Clark, chronicled on p. 614, vol. 1, of the NATURALIST. — In a work on the fossil birds of France, A. Milne-Edwards reports that all the fossil birds of the tertiary epoch can be included in the natural groups which still exist, though none of the species are identical with the living forms, and some are types of new genera. Of the quaternary period twenty-three species have been determined, only one of which, a very large *Grus*, is extinct, though as regards France, two species, *Lagopus albus*, the White Ptarmigan, and *Nyctea nivea*, the Snowy owl, both inhabitants of the arctic regions, no longer exist there, being relics of the Glacial period. — The Great Auk is supposed to have occurred of late years on the Norwegian coast, and it is supposed to have bred on Lundy Island (coast of Devonshire), in 1838 or 1839. — A commission of Dutch naturalists have reported on the Ship-worm, *Teredo*, and the means of combating its attacks. It bores into solid wood by the mechanical rasping action of the minute denticulations covering a part of the surface of its valves, the movements having been seen by M. Kater on a living animal. It has an enemy in a worm, *Lycoris fucata* Haan, which feeds upon it. As regards means of protection the commission report: —

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* The Record of Zoological Literature. Edited by A. C. L. G. Gunther, M. D., 1864-'66. London, 1865-'67, 8vo, vol. 1, pp. 634; vol. 2, pp. 784; vol. 3, pp. 649. The Mammalia, Reptiles, and Fishes are reported on by Dr. Gunther; the Birds by Alfred Newton; the Insects by W. S. Dallas; the Crustacea by C. Spence Bate; the Worms, Radiates, and Molluscoida (Tunicates and Polyzoa), by E. Percival Wright; and the Mollusca by E. von Martens. The price of each volume is about $6.00 in gold. We shall be pleased to take orders for our subscribers.

1. It is of no use to coat the surface of the wood with any substance supposed to be impenetrable to the Teredo, as this coating will be damaged sooner or later.

2. The impregnation of the wood with soluble inorganic salts, does not prevent the animal from invading the wood.

3. The hardness of the wood itself does not offer any protection, the wood of the "gaiac" and the "mamberklak" being invaded.

4. The only means offering a high probability of protection against the animals is the impregnation of the wood with creosote. — M. Alphonse Milne-Edwards says of *Lysianassa* (Eurytenes) *magellanica* that he has compared a specimen from Spitzbergen with one in the Paris Museum, "taken from a fish's stomach near the Straits of Magellan. These two individuals seem to resemble each other very closely (*beaucoup*), and I

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* Professor Owen divides the hoofed, or ungulated mammals, into *Perissodactyla* (those with an odd number of toes), and the *Artiodactyla* (including most of the ruminants), which consist of those with an even number of toes.

have only seen a difference between them of size." — The occurrence of a venomous black spider is noticed at Berdiansk, amongst the wheat at harvest time. — Guyon writes on the parasitic Flea, or Chigoe, *Pulex* (Rhynchoprion) *penetrans*, which lives under the skin of man and pigs. Among its natural enemies is the Cockroach (*Blatta Americana*). The False Scorpion (*Chelifer cancroides*) is destructive to the common Flea.—Donné gives an account of some experiments conducted for the purpose of determining the possibility of spontaneous generation (heterogeny). Pasteur replies to these observations of Donné's, stating that his experiments are not free from many sources of error, and pronounces it as his fixed opinion, that, in the actual state of science, heterogeny is a chimæra.

NATURAL HISTORY MISCELLANY.

BOTANY.

Can Lichens be identified by Chemical Tests? — Some interesting experiments illustrating the differences in the chemical constitution of Lichens have lately been published (Regensburg Flora, 1866; translated by Rev. W. A. Leighton, in the Journal of the Linnæan Society, of the same year) by Dr. Nylander, of Paris; and his observations have been followed by an extended application of one of the tests proposed to the large genus *Cladonia*, by Mr. Leighton (Annals and Magazine of Natural History, 1866), and by a general consideration of the described phenomena as recognizable in Spitzbergen species, by Dr. Theodore Fries (Lichens of Spitzbergen in Acta Holmiæ, 1867).

It appears, from these experiments, that Hypochlorite (Chloride) of lime furnishes "a sort of immediate analysis" of the colorable matter in *Roccella* (Archill of dyers) when applied, in solution, to the fronds; and the species which do not furnish this matter and fail therefore to exhibit the "erythrinic" reaction, or the presence of erythric acid (the case with our solitary, North American form) are of course in such way distinguishable from those which do. The same holds good in *Dirina;* in *Lecanora tartarea* (Cudbear of dyers) as compared with closely allied species, and in *Umbilicaria* and *Parmelia*, it being necessary in the latter that the inner, or medullary layer should be submitted to the test.

In like manner Hydrate of Potash is shown to effect several different reactions, according as the tissues subjected to it differ chemically. In most yellow *Parmeliei* (*Theloschistes*) and *Lecanorei* (*Placodium*) as in the red fruit of species of *Cladonia* and of *Biatora*, in *Heterothecium Domingense*, etc., the contact of the salt immediately induces a purplish tinge (supposed to indicate what has been called chrysophanic acid) and the species otherwise referable to the groups named which do not show this change (as *Theloschistes candelarius*) are thus elegantly, and sometimes